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Reliability and validity of the Turkish version of the Florida shock anxiety scale

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ABSTRACT

The aim of the study is to translate the Florida Shock Anxiety Scale (FSAS) into Turkish and probe the reliability and validity of this scale in a Turkish sample of Implantable Cardioverter Defibrillator (ICD) patients. The current study is a methodological cultural adaptation study. The Florida Shock Anxiety Scale was developed to measure fear associated with ICD shocks. The FSAS is composed of 10 items and originally was validated with two sub-factors. The current study was conducted in two different university hospital cardiology clinics in İzmir. One hundred and fifteen ICD recipients completed the FSAS. Content validity was evaluated with opinions of nine experts and between expert opinions about items of the scale was not found to be statistically significant different (p= 0.066), indicating agreement about relevant content. At the end of the confirmatory factor analysis it is concluded to use a one factor model. The factor loads of the items were found between 0.27 and 0.78. The correlation coefficient of the scores of each item and the scale score was r=0.37 - 0.77. Cronbach's alpha coefficient was found as 0.83. Pearson's correlation value was found as r=0.903 in retest (p= 0.000). Overall, results revealed that Turkish version of FSAS is a reliable and valid instrument in a Turkish sample.

1. Introduction

Implantable Cardioverter Defibrillators (ICDs) are used for preventing sudden cardiac death, ventricular tachycardia or fibrillation through the use of anti-tachycardia pacing and high energy shock. It is an electronic device that continuously observers heart rate and rhythm. If an abnormal heart rhythm is detected by the ICD, it gives energy in the form of electrical impulses or shock to the heart muscle, which helps the heart to return its normal (sinus) rhythm (American Heart Association, 2012). Unfortunately, patients usually experience this shock as painful and distressing (Magyar-Russell et al., 2011; Ford et al., 2012). A big amount of ICD and pacemaker patients can face some psychological symptoms such as anxiety and/or depression, which can affect their adjustment to the device (Kuijpers et al., 2002; Malm and Hallberg, 2006; Magyar-Russell et al., 2011).

ICD patients who experience shock or the knowledge of this function may increases the concerns about prospective shocks and it is known that the prevalence of anxiety is higher in this group than the general population. Finally, shock anxiety may turn in to a clinically significant anxiety disorder which

is associated with shock distressing (Magyar-Russell et al., 2011; Ford et al., 2012). The unpredictable and uncontrollable ICD shocks are one of the most distressing factors which lead poor psychological adjustment (Sears and Conti, 2002). In some of the studies that determine the ICD patients level of anxiety, generally Hospital Anxiety Depression Scale (HADS) (Keren et al., 2011; Magyar-Russell et al., 2011; Wilson et al., 2012) and State-Trait Anxiety Inventory (STAI) (Kohn et al., 2000; Kamphuis, et al., 2003; Dunbar et al., 2009; Kuhl et al., 2009; Pedersen and Spek, 2009; James et al., 2012;) were used. The scales are generally used to diagnose anxiety scales, but they are not specific for ICD patients. The Florida Shock Anxiety Scale (FSAS) was developed to be a sensitive quantitative metric of ICD shock-related anxiety for use in electrophysiology clinics and research (Kuhl et al., 2006).

The original FSAS validation showed that the reliability and validity of this specific measure of shock anxiety was acceptable. Two factors was emerged in factor analysis with the 66% variance. The first factor assessing fear or anxiety, which was related to the consequences of shock, and the second factor assessing fear or anxiety about triggering a shock. Thus, factor 1 was labeled as consequence factor and factor 2 was labeled as triggering factor. One item (fearing getting angry or upset will cause the ICD to fire) did not load on any factor (Kuhl et al., 2006).

At the end of the reliability analyses, the strong support for the factor structure was found (Cronbach's $\alpha = 0.91$; split-half = 0.92; test-retest total score = 0.79, $P < 0.01$). The consequence factor had high reliability ($\alpha = 0.88$) than the triggers factor had ($\alpha = 0.74$) (Kuhl et al., 2006).

The FSAS has been used as a shock anxiety measure globally in Canada (Vazquez et al., 2010), Australia (Keren et al., 2011), China (Chair et al., 2011) and America (Ford et al., 2012). In Chinese study, the crohnbach alpha is found 0.81, in American study it is found 0.89 (Chair et al., 2011; Ford et al., 2012). The measure it has been assessed in a primarily female participant sample (Kuhl et al., 2006) given the predominately-male participant sample of the initial evaluation in the United States (Vazquez et al., 2008). It hasn't been studied in Turkey yet. The purpose of the study is to adapt the Florida Shock Anxiety Scale (FSAS) into Turkish and probe the reliability and validity of this scale.

2. Materials and methods

Setting and sample

This methodological cultural adaptation study was conducted in two different university hospital cardiology clinics in İzmir between March 2012 and March 2013. Patients were recruited during an outpatient cardiology clinic and were at least three months post implant, able to speak and understand Turkish, older than 18 years old. Patients with serious medical illnesses, cognitive dysfunction, or a history of psychiatric illness and hearing impairment were excluded in the study. The total number of 115 participants completed the questionnaire.

Outcome measure

The final sample of 115 patients completed the questionnaire, such as the FSAS and the demographic questions.

Florida Shock Anxiety Scale

The Florida Shock Anxiety Scale (FSAS) is a brief tool which was provide a quantitative measure of ICD shock-related anxiety. It was designed by an interdisciplinary team including electrophysiology and clinical psychology. The scale consists of 10 items and two subscales. The anxiety related to the consequences of device called consequence factor and the anxiety related to triggering device shock called trigger factor. Each item was rated on a 5-point Likert scale from 1 (not at all) to 5 (all of the time). Higher total scores indicated higher shock anxiety. The total score is calculated by summing the items. A patient who scores 3 or higher on any item should receive counseling related to his specific concerns. The reliability analyses revealed strong support for the factor structure; the Cronbach's α of the overall items was 0.91, split half was 0.92, and the test-retest score was 0.79, $P < 0.01$. The reliability of the consequence subscale was high with Cronbach's $\alpha = 0.88$ and the Cronbach's α of the trigger subscale = 0.74.20 (Kuhl et al., 2006).

Demographic questions

This form is comprised of patients' socio-demographic features: Age, sex, social insurance, educational status, marital status, occupation, economic condition and descriptive features: Duration of ICD implantation, number of ICD shocks, ICD indication and sudden cardiac death experience.

Statistical analysis

Analysis was conducted using descriptive statistics and appropriate reliability and validity statistical tests using the Statistical Package for the Social Services (SPSS) 15.0 (SPSS Inc., Chicago, IL) and the LISREL program. For the content validity expert opinions were assessed through Kendall W analysis. For construct validity confirmatory factor analysis was used (LoBiondo-Wood et al., 2005; Şimşek, 2007; Harrington, 2009). Pearson's Product-Moment Correlation Coefficient was used for reliability analysis, also item total score correlation and Cronbach alpha analysis. Test-retest measurement was assessed using Pearson Correlation

and a dependent t-test with ten days interval (Karasar, 2000; Gözüm and Aksayan, 2003). For retest, fifteen days following the first administration, the FSAS was given to 30 patients again.

Ethical considerations

This study conformed to the Helsinki Declaration of Human Rights and respected the individual rights of the participants. Written permission was taken to adapt the FSAS into Turkish and to use the instrument in this study. This study was approved by the ethical review boards at the authors'institution (and each hospital). Written consent was obtained from each participant. Following informed consent, patients were asked to complete the questionnaire and demographic data sheet.

3. Results

Descriptive statistics

The total sample of the study was 115. Patients were mostly male (70.4%) and had a mean age of 59.63 ± 15.03 (min=25, max=94) years. Most of the patients were graduated from primary school (47.8%), married (87.8%) and retired (64.3%) (Table 1).

The FSAS mean score of the patients was 18.25±8.84 (min=10, max=46).

Table 1. Characteristics of participants (n=115).

Validity Analysis			
Characteristics	**Mean**	**SD**	**Min-Max**
Age	59.63	15.03	25-94
Implantation duration (month)	33.53	29.65	20 days-120 months
Number of shocks	5.52	14.00	0-100
	N	**%**	
Gender			
Female	34	29.6	
Male	81	70.4	
Education			
İlliterate	5	1.7	
Literate	2	4.3	
Primary education	55	47.8	
Secondary education	12	10.4	
High school	19	16.5	
University and higher	22	19.1	
Marital status			
Married	101	87.8	
Single	14	12.2	
Occupation			
Housewife	21	18.3	
Officer	5	4.3	
Worker	5	4.3	
Retired	74	64.3	
Self-employed	8	7.0	
Other	2	1.7	
Economic condition			
Income < expense	57	49.6	
Income = expense	53	46.1	
Income > expense	5	4.3	
Social insurance			
Yes	114	99.1	
No	1	0.9	

Translation of FSAS

First, the instrument was translated from English to Turkish. Language validity of the scale was analyzed as the first step of the research conducted to test the validity of the scale for the Turkish society. Scale was translated into Turkish by all researchers and two different translation offices. The researchers reviewed the initial Turkish version of the scale and then recruited one Turkish version of the FSAS. The forward-translated version was then back-translated by a professional bilingual translator unfamiliar with either the English or the Turkish versions of the FSAS to ensure the accuracy of the translation. and the original form and the translated English form were checked by the researchers. Forward-translated and back-translated instruments and the choice of words was discussed until a final version was composed (Karasar, 2000; Gözüm and Aksayan, 2003). The translated Turkish version submitted to the expert opinion (four faculty members from the Faculty of Nursing, one head nurse from the coronary intensive care unit, one head nurse from the Department of Cardiology, one cardiology assistant doctor, one psychiatry assistant doctor and one cardiology professor) for an analysis of its content validity. Experts were asked to rate each item in the Turkish version of the FSAS based on relevance, clarity, and simplicity on a scale of one (not appropriate at all) to ten (completely appropriate). Acquiring the final form with expert opinions, the scale was used in pre-interviews conducted with 15 patients. Scores of the nine experts were evaluated using the Kendall W analysis, and no statistically significant difference was found among the scores. As a result, it was determined that expert scores were consistent with one another. The overall Cronbach's α of the Turkish version FSAS used in this study was 0.83.

Construct validity

Confirmatory factor analysis. The suitability of data was assessed prior to conducting factor analysis. The Kaiser-Meyer-Olkin value was 0.86 and Bartlett's test of sphericity reached statistical significance χ^2= 319,033 p= 0.000, thus supporting the factorability of the correlation matrix.

In order to determine if the two-factor exploratory factor analysis model found by Kuhl and associates during the initial development of the FSAS (Kuhl et al., 2006) could be replicated, an exploratory model specifying the two factors was initially estimated. Estimation of the two-factor exploratory model with factors obliquely rotated using promax revealed a different pattern of loadings. Specifically, FSAS items 2,5,6,7,8,9 loaded on consequence factor in the original form whereas in Turkish form the 4,5,7,8,9,10 items loaded on consequence factor. The 1,4,10 items loaded on trigger factor whereas in Turkish form 1,2,3,6 items

loaded on trigger factor. In the original form of FSAS third item (fearing getting angry or upset will cause the ICD to fire) did not significantly load on either factor. But in the Turkish form, it is loaded on trigger factor. On the FSAS, items are grouped under specific meanings. For example; Factor 1, including fearing that the device would not fire, fearing being alone when device fires, fearing a rapid heartbeat, having unwanted thoughts about firing, fearing consequences of touching others, and fearing creating a scene if the device were to fire. Although these are all diverse items, a common underlying theme seems to be fears related to consequences associated with device shock. Therefore, this factor could be labeled the consequence factor. On the other hand, the three items that loaded on Factor 2 appear to be more related to triggering device shock (fearing sexual activity, fearing exercise, and fearing not knowing when the device would fire); thus, Factor 2 could be labeled the trigger factor. But in this study the items that loaded on these factors did not meet these meanings (Kuhl et al., 2006). Therefore, the analysis was done again with single factor model (Fig. 1).

At the end of these analyses, it was concluded that the two-factor model did not meet the meanings that the original items have. Thus, a one factor model was used.

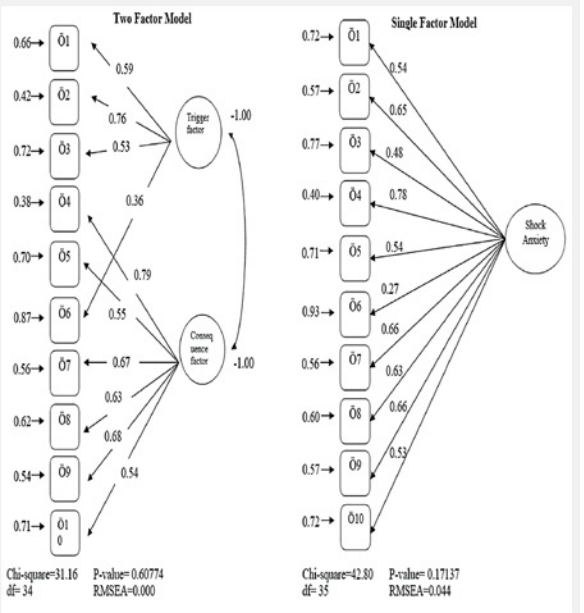

Fig. 1. Comparison of the second-order and single-factor models of the Florida Shock Anxiety Scale

Consistency values were determined as follows: "chi square=42.80", "Root Mean Square Error of Approximation (RMSEA)= 0.044", "Standardized Root Mean Square Residual (SRMR)= 0.055", "Comparative Fit Index (CFI)= 0.98", "Non-Normed Fit Index (NNFI)= 0.98", "Normed Fit Index (NFI) = 0.93", "Goodness of Fit Index (GFI) = 0.93". The factor loading was between 0.27-0.78.

Reliability

Internal consistency analysis

When item-total score correlations of 10 items were examined in the reliability analysis of the FSAS, it was found to be 0.37 - 0.77 at a statistically significant level ($p < 0.001$) (Table 2). In the analysis conducted to test the internal consistency, Cronbach alpha coefficient was 0.83.

Table 2. Item-Total Score Correlations of Florida Shock Anxiety Scale (n= 115).

FSAS Items	Item-total Score Correlations (r)*	p
Characteristics	**Mean**	**SD**
I am scared to exercise because I am scared that it will increase my heart rate and cause my device to fire.	**.645**	**.000**
I am afraid of being alone when the ICD fires and I will need help.	**.736**	**.000**
I do not get angry or upset because it may cause the ICD to fire.	**.592**	**.000**
It bothers me that I do not know when the ICD will fire.	**.774**	**.000**
I worry about the ICD not firing sometimes when it should.	**.586**	**.000**
I am afraid to touch others for fear that I will shock them if the ICD fires.	**.366**	**.000**
I worry about the ICD firing and creating a scene.	**.686**	**.000**
When I note my heart beating rapidly, I worry that the ICD will fire.	**.679**	**.000**
I have unwanted thoughts of my ICD firing.	**.654**	**.000**
I do not engage in sexual activity because it will cause my ICD to fire	**.526**	**.000**

Test-retest reliability

To determine whether or not there were differences in the mean scores obtained from the scale between the first and second administration, the scale was evaluated using the t-test in dependent groups. No statistically significant differences were found ($p > 0.05$, p=0.344).

When the relationship between scores obtained from first and second administration was evaluated with Pearson correlation analysis, it was determined that there was a very strong, positive, and statistically significant relationship between test-retest scores (r=0.903, p=0.000) (Table 3).

Table 3. Test-retest Scores of Participants (n=30).

Scale	FSAS score		Correlation	Analisis results		
	First implementation X ± SS	Second implementation X ± SS	r	p	t	p
FSAS	**16.40± 7.05**	**16.97± 7.47**	**.903**	**.000**	**-.963**	**.344**

4. Discussion

We evaluated a Turkish version of the Florida Shock Anxiety Scale and confirmed the reliability and validity in a Turkish sample of ICD patients. Consistent with recent research with the FSAS (Ford et al., 2012), this tool may better reflect a one factor measure of shock

anxiety. These results are promising because shock anxiety remains an important aspect of the care of ICD patients to reach exhaustive health outcomes.

Our confirmatory factor found that the original subscales and their meanings did not identically match with our results. In this study, at the end of CFA it was determined that factor loads of all items were between 0.27 and 0.78. CFA recommends that each item should have a model-data fit coefficient value of at least 0.30 and above (Harrington, 2009). The sixth item model-data fit coefficient is below 0.30. The reason for this low is thought to be the patients' lack of information about the ICD device functions. During data collection patients questions about this item and received answers showed a lack of information. This item has a high correlation with other items and when this item is removed the structure validity of the scale is corrupted. Thus this item has decided to not remove from the scale by the authors.

Goodness of fit statistics should also be at the desired level in the confirmatory factor analysis. In the chi-square test performed as the fit statistic, it was determined that chi-square fit value was significant (x2/df=1.22 (42.80/35). The fact that this value is two or less means that it is a good model. However, the fact that this value is five or less shows us that the model has an acceptable goodness of fit (Tavşancıl, 2005; Harrington, 2009). In this study model-data fit was found to be good.

The other tests that used to measure goodness of fit are Root Mean Square Error of Approximation (RMSEA), Standardized Root-Mean-Square Residual (SRMR), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI) (Şimşek, 2007; Harrington, 2009). The fact that RMSEA is equal to or less than 0.080 and p value is lower than .05 (that it is statistically significant) means a good fit (Şimşek, 2007; Harrington, 2009), while a value equal to or less than 0.10 indicates a poor fit (Harrington 2009). In this study, RMSEA value was found 0.04. This value indicates data consistent with the model.

A value of SRMR lower than .10 and CFI, NNFI values equal to or more than 0.90 indicate that there is fit in the scale (Şimşek, 2007; Harrington, 2009). In this study, SRMR, CFI, and NNFI values indicated a good fit. Results of this study support the construct validity of the Turkish version of the FSAS and that it is a valid instrument for use in Turkish samples.

In this study, the FSAS demonstrated acceptable internal consistency. One of the methods used to evaluate the internal consistency in the adapted scales in terms of reliability is the item analysis. Even though sufficiency level of item-item score correlation coefficients displays variety in the literature, in general, minimum level is accepted as .20 items with reliability coefficients between .30 and .40 are considered as "good", while items having reliability coefficients above 40 are reported as ideally distinctive, and thus reliable (Gözüm and Aksayan, 2003; Tavşancıl, 2005). In this study, item-item score correlation coefficients were 0.37 - 0.77.

In our study, Cronbach Alpha coefficient of the scale was found to be within highly reliable (0.83). Test-retest analysis is one of the most frequently used reliability analyses and evaluates the invariance characteristic of the measurement tool. Obviously, there was consistency between measurements performed at specific intervals as there was not a difference between test-retest score averages, test-retest reliability coefficient was r=0.903, and there was a statistically positive and highly significant relationship between test-retest scores (Tavşancıl, 2005; Polit and Beck, 2008). The Turkish FSAS was found to have a high level of reliability.

The current study revealed that Turkish version of Florida Shock Anxiety Scale is a reliable and valid instrument in a Turkish sample. Consistent with recent research with the FSAS, this tool may better reflect a one factor measure of shock anxiety. Since it is a brief scale, it is easy to use and practical. In addition, it is a device-specific scale to evaluate ICD patients' shock-related anxiety and can used in the clinical practices and research in Turkey.

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